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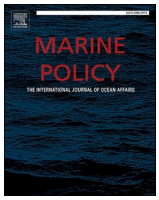

# The importance of rebuilding trust in fisheries governance in post-Brexit England

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ABSTRACT

The sustainable management of common pool resources, like fisheries, relies heavily on trust and reciprocity between managers and stakeholders (fishers). The UK Fisheries Act of 2020 and the Joint Fisheries Statement of 2022 seek to reinvent post-Brexit fisheries governance and the economic and environmental sustainability of the sector. Management of the fisheries sector through Fisheries Management Plans (FMPs) is still under development but changes in governance arrangements are likely to significantly impact fishers' livelihoods. This highlights a need for improved collaboration between fishers and the governing institutions. Using a novel survey design, representatives of the English fisheries sector were surveyed to capture their level of different forms of trust (rational, affinitive, system-based) towards national and regional governing institutions. Overall, low levels of trust were found, although regional institutions (i.e., Inshore Fisheries and Conservation Authorities) were more trusted than national institutions (i.e., Department for Environment Food and Rural Affairs and Marine Management Organisation). Exploring different forms of trust revealed nuance between the institutions and distinctive regional differences. To build on this, interviews were conducted revealing feelings of apathy and conflict towards the governing institutions rather than inclination towards collaborating. Trust has a role in fostering more resilient fisheries management and fishers discussed the need for sustained institutional efforts to rebuild trust post-Brexit through greater transparency, face-to-face interaction, and meaningful consultation. Our research also reveals that FMPs will need to factor in geographical differences and that current institutions will need to work more collaboratively in order to foster local adaptive management.

## 1. Introduction

Governance of fisheries and coastal regions has been labelled as a 'wicked' problem [1]. A 'wicked' problem describes a social planning problem, like fisheries governance, which is characterised by difficulties in definitions, uncertain variables, and disagreement among stakeholders over facts, perspectives, and values [2]. Fisheries management presents the typical challenges of governing competition over access to a common-pool resource (CPR, [3,4]) but intertwining complexities from the mobility of fish stocks and associated socio-cultural and livelihood factors complicates governance further. Moreover, the structure of the UK fishing industry, including power imbalances between fleet segments (e.g., producer organisations and inshore fleet, under and over 10 m, [5], Carpenter et al., 2020), the differing management strategies (e.g., quota versus effort, quota versus non-quota species, Carpenter and Kleinjans, 2017), and the resulting differing levels of fisheries and biological data increase uncertainty in fish stock assessment and fisheries governance, with stakeholders often disagreeing on stock health and management. Additionally, the dynamic nature of fisheries means no single institutional arrangement fits all cases [6]. Therefore, governance must be adaptive and locally and fishery specific.

The management of CPRs like fisheries heavily relies on trust and reciprocity [3,4]. Trust is an intangible asset that regulates the relationships between agents and is essential in successful collaboration between stakeholders [7-9]. Trust is also a psychological state in which the trustor accepts some level of vulnerability based on positive

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expectations of another individual, organization or trustee [10]. Levels of trust between the trustor and trustee can be characterised as high or low, but critically low levels of trust must be differentiated from distrust [11].

Hamm [12] distinguishes two theoretical approaches to measure and understand trust: elemental and the 'forms of trust'. The elemental approach, which examines trust as an attitude of the trustor, has dominated trust research [13]. The 'forms of trust' approach examines the key factors explaining trust [14]. Previous studies on trust in fisheries [15-18] did not test the key 'forms of trust' identified by Stern and Coleman [14]. This paper contributes to this literature, by exploring the level of overall trust and forms of trust in English fisheries management to support the implementation of new post-Brexit Fisheries policies.

### 1.1. Trust in the governance of natural resources and fisheries

Governance of fisheries in the UK is in a state of transition post-Brexit, and this transition offers an opportunity to reset or improve trust relations between fishers and governing institutions as well as to enhance sustainability [19]. Researchers investigating implementation issues surrounding the EU Common Fisheries Policy (CFP) found a lack of trust between fisheries stakeholders in Ireland [20] and its overall unpopularity with fishers in the UK problematic [15,21]. In the UK, for example, a survey of fishers prior to the Brexit referendum in June 2016, targeting skippers of larger vessels in NE Scotland, showed that 92% were likely to vote for Brexit [16] and promises of "take back control".

The erosion of trust has been a long-term process for the UK fishing industry, dating back to the Cod Wars of 1958–76, which saw historic fishing rights to Icelandic fishing grounds restricted in a series of concessions to the Icelandic Government [22]. Coinciding with this, competition in UK waters was being increased with the UK joining the European Union (EU) and its CFP in 1973. This gave equal fishing access to all members Exclusive Economic Zones (EEZs) and saw the privatisation of fishing with the introduction of Total Allowable Catches (TACs) in 1983 [23]. Early on after the vote for Brexit, as new institutions and regulations were to be announced, fishers were hopeful but uncertain [17,24]. However, the perceived poor Brexit deal for UK fisheries generated anger and disappointment contributing to an already undermined trust in the UK government [21].

Against this background, the Fisheries Act [25] outlines the objectives for the future of UK fisheries governance (e.g., sustainability, precautionary principle). The Joint Fisheries Statement (JFS) also recognises the socio-cultural importance of commercial and recreational fishing for coastal communities [26] and the strong ties with the local socio-economic fabric including the complex employment arrangements in the sector.[1] The FMPs will define in detail the rules to achieve the overall objective of the JFS [27]. While the FMPs are expected to announce new rules and regulations for fishers, it is important that the governance of the transition considers workers in the sector (Sparks, 2022) and communities to secure the benefits for coastal areas.[2] Ideally, the fisheries policy authorities will manage this transition with the support of communities [28]. Trust in these institutions may affect the level of cooperation of fishers with the new rules and regulations. Therefore, understanding trust between fishers and institutions which govern them is crucial if post-Brexit fisheries governance is to achieve its objectives and be resilient in the face of numerous ongoing challenges. These include issues around stocks, the power imbalances between larger fishing vessels (generally members of Producer Organisations (POs) which hold and manage quota), the smaller (under 10 m) vessels which make up the inshore fleet (generally not POs members relying on non-quota species), processors and regulators, and exogenous events like climate change and environmental pollution.

Trust has been a recent topic of fisheries research in the UK (e.g., [15, 18]). In a survey of 48 fishers from across the UK in 2018 (after the Brexit vote in 2016 but before the official EU exit in January 2020) Ford and Stewart [15] investigated fishers' trust in the full breadth of stakeholder and governance institutions. They utilised the elemental model for understanding trust through five components: integrity, competence, transparency, benevolence and cooperation [29]. Despite the small sample size, the results across all institutions were statistically significant. Low levels of trust in national institutions such as the Department for Environment Food and Rural Affairs (DEFRA) and the Marine Management Organisation (MMO) were found indicating a significant problem for fisheries governance, while those institutions with which fishers have more regular contact, such as the regional Inshore Fisheries and Conservation Authorities (IFCAs, see Fig. 1), received higher levels of trust. Other research has highlighted this reported lack of trust to DEFRA as a barrier to the success of its low impact fishing framework co-design project in 2019/20 [18]. In this new study, we aim to deepen the previous research on trust by specifically focussing on England in the years following the Brexit agreement, and after several other major disturbances such as the Covid pandemic and a major die-off of marine life along the North East coast.

A recent meta-analysis on trust more widely in natural resource management (NRM) [31] reveals that no individual factor emerged as sufficient for building and sustaining trust. Rather, antecedents such as reputation and cooperation were key in determining trust followed by communication, shared norms and values, and negative past experiences. Although, the 'forms of trust' approach has been critiqued, as each form of trust leads to similar states of vulnerability of the trustor and therefore there are complexities in quantitative research using the forms, there is utility in dividing trust into multiple forms as it allows understanding of the process by which trust develops, is lost and can be rebuilt [12], and what forms are associated with this process. Stern and Baird [32] present a model for understanding NRM institutional resilience utilising the 'forms of trust' approach with a focus on the inter-relation of different trust types. The trust types considered, based on Stern and Coleman [14] framework, are dispositional, rational, affinitive and systems-based trust (Table 1).

Stern and Baird [32] find that a high diversity of these trust types is necessary for NRM governance institutions to be resilient to disturbances such as environmental change, institutional performance failure or personnel turnover (Fig. 2). They utilise the biological concept of functional redundancy, whereby there is a surplus of necessary trust for the functioning of governance in NRM. Furthermore, their model includes a complacency threshold, where too much trust can yield complacency and a lack of urgency to participate in governance [32]. This has been observed by researchers investigating the dual function of different levels of trust or distrust and the behaviours they elicit [33,34, 9]. These behaviours are critical in differentiating between lack of trust and distrust, with negative function behaviours like apathy associated with lack of trust and behaviours such as unproductive conflict and withholding of information associated with distrust [32].

The Stern and Baird [32] model is supported by case studies, furthermore the empirical validity of the forms of trust can be demonstrated by relating each trust type to a corresponding 'trust as an attitude' antecedent in Ford et al. [31] meta-analysis (Table 1). This provides the prospect for evaluating the forms of trust quantitatively in NRM and evaluating the Trust Ecology of governance and the resilience to disturbances in vital natural resources like fisheries.

## 2. Materials and methods

This paper builds on the work of Ford and Stewart [15] by using a novel questionnaire and interactive interviews to include an analysis of

[1] The fisheries sector is characterised by a unique labour structure and employment challenges span from inherent sectoral vulnerabilities, to lack of training and skills, to conflictual working arrangements between national and overseas workers (Carpenter et al., 2020; Sparks, 2022; Financial Times, 2023).

[2] In the JFS the word 'communities' is mentioned more than 30 times.

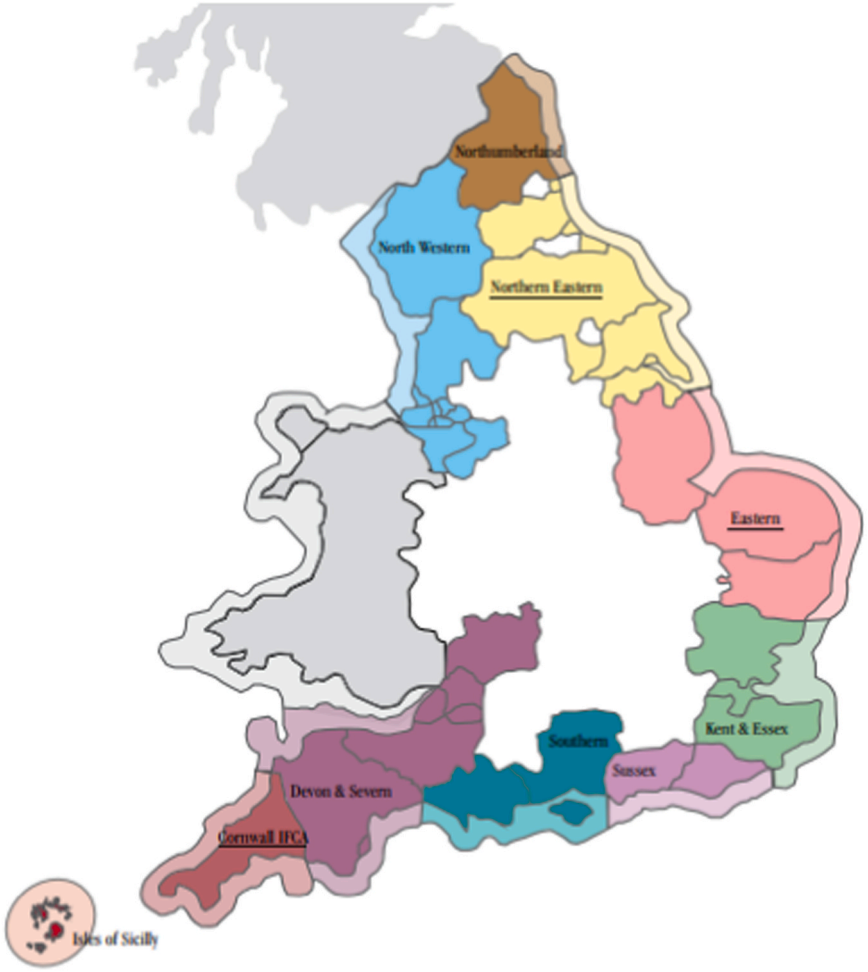


**Fig. 1.** Map of the ten IFCA regions, with the Northern Eastern IFCA and Eastern IFCA on the east coast and the Cornwall IFCA in the south-west. Adapted from an image on the Association of IFCAs website [30].

**Table 1**
Definitions of the four forms of trust.

| Trust form | Definition (adapted from[14]) | Related trust as an antecedent[31]. |
|---|---|---|
| Dispositional | Predisposition of individuals to trust. | Negative past experiences. |
| Rational | Assessment of potential outcomes based on trustees' predicted behaviour. | Service quality, reputation. |
| Affinitive | Perception of shared values and communicability of potential trustee. | Shared norms and values, communication. |
| Systems-based | Assessment the trustees' procedures and the degree of risk involved in trust relationship. | Reputation, communication. |

fishers' shared norms and values. In the sections below we describe how trust is measured and the survey and interview process. Research ethics approval of the survey and the interview script used in this research was received from University College London's Research Ethics Committee (Approval ID Number 4474/002). All participants in this research provided explicit consent to participate. The consent forms can be found in the supplementary materials.

### 2.1. Measuring trust

Trust is a complex concept to examine due to its variability and the context of the relationships being surveyed [35]. Respondents are typically asked about their agreement level to statements about the institution using the elements of trust [35,36]. For our research, a novel approach was implemented to quantitatively evaluate the different forms of trust, as proposed by Stern and Coleman [14], by relating each to a corresponding element of trust shown to be important by Ford et al. [31]. This design allowed for an assessment of the overall trust level in the fisheries governance institutions, the trust ecology, and institutional resilience. Table 2 shows the statements constructed to assess each form of trust: rational, affinitive and systems-based. Trust was measured using mean Likert scale scores.

### 2.2. Case studies

Regional events can generate tensions between governing institutes and fishers. In this paper, we focus on the Northern Eastern IFCA (NEIFCA) and Eastern IFCA (EIFCA) regions (see Fig. 1), although other regions also had significant tensions, for example in the Cornwall IFCA (CIFCA) region where proposals for the management of crab and lobster fisheries, exacerbated tensions related to the implementation of iVMS (vessel tracking): Cornwall fishers submitted a letter of no confidence in the MMO [37].

In the NEIFCA region in winter 2021, a mass mortality of crustaceans along the coast of Teeside and Yorkshire heavily impacted the fisheries sector, including commercially important crabs and lobsters [38]. In response to the perceived lack of initial action from the NEIFCA, Yorkshire fishers submitted a letter of no confidence in the NEIFCA leadership [39]. These fishers attributed the mass mortality of crustaceans to increased levels of the toxic chemical pyridine in the water and sediment

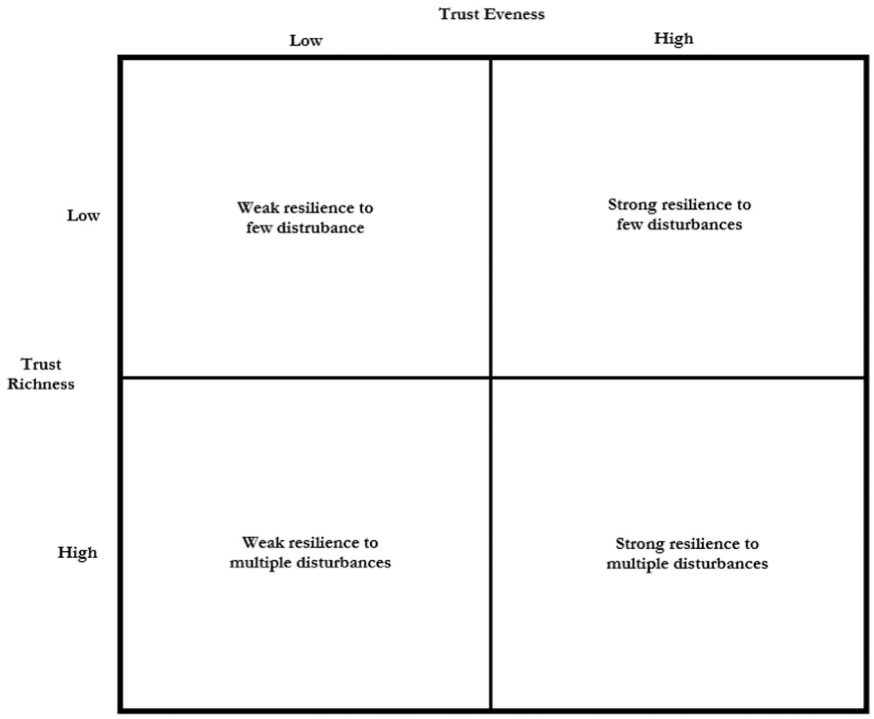


**Fig. 2.** Trust ecology model schematic. Evenness and richness relate to the level and presence of each trust type. adapted from Stern and Baird [32].

**Table 2**
The questionnaire statement design and connection to elements and forms of trust.

| Statement | Statement about institution | Element of trust | Form of trust |
|---|---|---|---|
| (1) Competence | Is effective and competent. | Service quality | Rational |
| (2) Interests | Acts in the best interests of fishers like me. | Shared norms and values | Rational |
| (3) Values | Shares my values. | Shared norms and values | Affinitive |
| (4) Communication | Is easy to communicate with. | Communication | Affinitive |
| (5) Transparency | Is transparent in their actions. | Communication | Systems-based |
| (6) Reputation | Is a reputable institution | Reputation | Systems-based |

due to the dredging activities surrounding the Tees estuary [40]. However, an initial government report concluded that the mass mortality event was likely caused by an offshore algal bloom.[3] This report was met with scepticism by fishers in their belief that the science around the impacts of dredging was being covered up by DEFRA; prompting local fishers to contract an independent scientist to review the evidence [41]. Subsequently, Henderson et al. [38] produced an independent report with inconclusive evidence of the cause of crustacean mortality and a second report by an independent panel of experts similarly concluded that the cause was unlikely to be an algal bloom, but crucially it did not consider pyridine contamination following the Tees dredging as a likely cause [42]. Following the release of internal documents from the Environmental Agency (EA) the validity of the evidence which supported the algal bloom theory was questioned [43]. This string of reports itself will likely have affected trust relations, with elements such as transparency, competence and communication playing a large role in the conflict and perhaps in future post-Brexit fisheries governance.

In the EIFCA region, in 2020 Natural England in collaboration with EIFCA published a disputed report on the impact of potting fishery on chalk reefs potentially affecting the North Norfolk local crab fisheries (Tibbit et al., 2020). Like in the NEIFCA region, a report (on human impacts on the chalk reef) was challenged by fishers. A subsequent consultation on the development of a byelaw to manage the potting fishers has been open.[4] (A call for evidence and consultation on management strategies for the crab and lobster fisheries is also currently open in Cornwall.[5]) This willingness to challenge regulators combined with a lack of trust will be a potential barrier to management measures to improve national and regional fisheries governance.

### 2.3. Survey methodology

The geographical focus of the questionnaire is on relevant institutions in England (DEFRA, MMO, and IFCAs), however, respondents from Scotland and Northern Ireland were still able to selectively answer the survey questions to institutions with whom they have interacted. The questionnaire was piloted (supplementary materials 1) with five

[3] https://deframedia.blog.gov.uk/2022/09/30/defra-response-to-new-research-on-crustacean-mortality-incident.

[4] The EIFCA ran and informal consultation on management of crab and potting fisheries (www.eastern-ifca.gov.uk/eastern-ifca-informal-consultation-management-of-crab-and-lobster-potting-fisheries) and a formal consultation on crab and lobster fisheries bylaws (www.eastern-ifca.gov.uk/eastern-ifca-formal-consultation-cromer-shoal-chalk-beds-byelaw-2023-crab-and-lobster-byelaw-2023).

[5] The CIFCA detailed its call for evidence and consultation in 2023 after a period of discussion which started in 2021 (www.cornwall-ifca.gov.uk/consultation-response-form).

experts (academic, IFCA, National Federation of Fishermen's Organisations NFFO, and a Whitby lobster hatchery representative), with resulting edits in language e.g., the removal of the term 'sustainability' from statement 3 as it can mean different things to different fishers.

The questionnaire was developed in Qualtrics and included an initial demographics section followed by three matrices of the statements in Table 2, one for each of considered governance institutions, to be answered with a 5-point Likert scale, where 1 was 'strongly disagree' and 5 'strongly agree'. A screening question was included prior to the matrices to check the respondent had heard of each of the institutions, whereby a negative response excluded the matrix of statements on that institution. The presented order of the institutions was randomised to minimise ordering bias. Scores, presented in the following sections, represent the mean of the Likert scale scores across all the statements calculated as $\sum_{i=1}^{n} x_i/n$, where $x_i$ is the Likert score for the statement $i$ and $n$ is the total number of statements answered.

### 2.4. Survey distribution

The survey was distributed between July and August 2022 utilising a variety of dissemination channels, such as the NFFO general mailing list, an article in a fisherman's newspaper, 'Fishing News' (see supplementary materials), and the social media platforms of two regional IFCAs (Eastern IFCA, EIFCA and the North-eastern IFCA, NEIFCA). A limitation is that the sample is unlikely to be representative of the inshore (under 10 m) fleet with the above distribution methods focussed on England and with the NFFO excluding Scottish fishers and organisations. Furthermore, relatively few members of the inshore fleet are members of the NFFO. However, the Fishing News readership is national and reaches 16,000 readers (Fishing News, 2023).

Chronologically, data collection took place shortly after and during a number of crucial events: after the formal EU-exit (January 2020) and the Trade and Cooperation Act, with the implementation of the UK Fisheries Act in progress (see [21]), after approximately 2 years of Covid-19 pandemic restrictions and during extreme tensions between governance institutions and fishers caused by exogenous events in two IFCA regions – NEIFCA and EIFCA [38,44]. Indeed, these events guided the geographical scope of the follow-up interviews. Although these events and tensions particularly impacted regional fisheries, they sit in a wider national context of long-term erosion of fishers' trust which exacerbates (and is exacerbated by) local dynamics.

### 2.5. Interview methodology

In addition to the questionnaire, semi-structured interviews were conducted. Interviewees were asked to complete the questionnaire detailed above and then asked to explain their responses. Follow-up questions provided details on experiences which influenced their answers, whether they perceived low scores as lack of trust or distrust, and if they were apathetic towards or in-conflict with the institution. A final question asked fishers if they had heard of or been consulted for the JFS. (See supplementary Materials for the general questions asked in the interviews).

Potential interviewees were approached via industry contacts. The target zones for the interviews were fishers operating in the NEIFCA and EIFCA regions since both places had recently experienced critical environmental conditions that potentially threatened the fisheries' sustainability (see Section 2.2).

### 2.6. Analysis of responses

Data analysis combined statistical analysis of the questionnaire responses with qualitative thematic analysis of the questionnaire open-ended responses and interview responses. Specifically, to evaluate the trust scores a standard mean of responses was used, while a Kruskal-Wallis test analysed the differences between the Likert-scale scores of different respondents and institutions, following the method used by Ford and Stewart [15]. The questionnaire comments and interviews were analysed for key topics, themes, and patterns around the elements and forms of trust summarised in Table 2 and analysed for positive and negative sentiments. This analysis was conducted using the NVivo software.

## 3. Results

This section reports average trust results from the questionnaire. It is followed by results on the forms of trust from both the questionnaires and interviews. Quotes are in italics and information is provided on whether the quote is from the questionnaire or from which fisher (interviewee), e.g., Interviewee #2.

### 3.1. Trust scores (questionnaire)

Of the 94 responses collected, only 52 were complete. After removing responses from outside of England, 46 were used in this analysis. Table 3 reports the breakdown of these respondents' demographics.

The 52 respondents represent ca. 0.49% of the UK fishing industry, but considering the focus on England, the 46 respondents from England represent ca. 0.94% of English fishers [45]. Questionnaire respondents represented those operating in the following IFCA regions: Eastern (17), Cornwall (12), North-eastern (9), Devon & Severn (5), and one each in Kent & Essex and Southern. Another six respondents were from other regions (Scotland (3), Northern Ireland (1), Wales (1) and one from multiple regions) but were excluded to focus on English participants. One respondent did not respond to this question, and Sussex, Isles of Scilly and Northwest were not represented. Over half (57%) of the respondents were from under 10 m vessels, indicating some underrepresentation given 82% of the English fishing fleet consists of this sector [46].

The overall average trust score (the mean of the three forms of trust scores) for each of the governance institutions, is presented in Fig. 3.

Overall, mean scores were similar to previous UK research [15]. Low scores correspond to either a lack of trust or distrust in the institutions which govern fisheries in the UK (particularly in England). A test of

**Table 3**
Questionnaire respondents' demographics (n = 46).

| Variable | Classes | % |
|---|---|---|
| Age | 18-30 | 15 |
| | 31-40 | 20 |
| | 41-50 | 26 |
| | 51-60 | 28 |
| | 61 + | 11 |
| Role | Crew member | 17 |
| | Skipper | 24 |
| | Skipper and owner | 57 |
| Vessel type | Under 10 m | 57 |
| | Over 10 m | 41 |
| Time in industry | < 5 years | 9 |
| | 5-10 years | 11 |
| | 10-20 years | 15 |
| | 20-30 years | 24 |
| | 30 + years | 39 |
| IFCA region | Eastern | 37 |
| | North-eastern | 20 |
| | Cornwall | 26 |
| | Devon & Severn | 11 |
| | Kent & Essex | 2 |
| | Southern | 2 |

Note: Totals may not add up to 100% as some respondents did not answer all the demographic questions. "Other" was available for IFCA region, for which 6 responses were submitted. These responses are excluded in the above table.

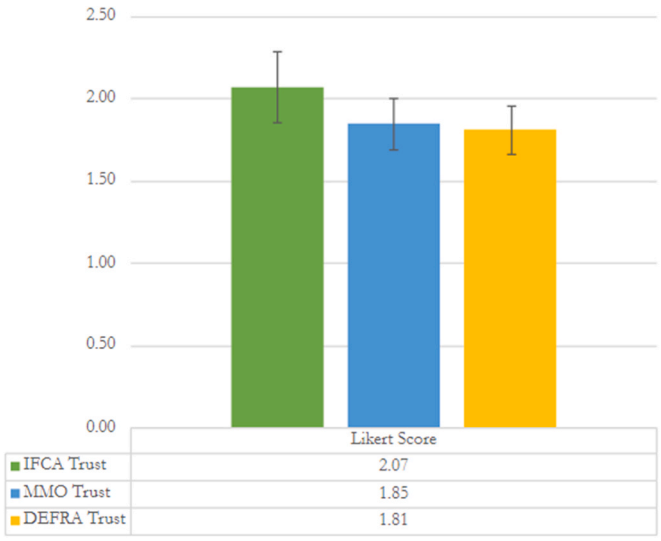


**Fig. 3.** Average trust score by institution with standard error bars. Sample size: IFCAs n = 44, MMO n = 45, DEFRA n = 44.

difference in distribution (Kruskal-Wallis test) revealed no significant variation across respondents' average scores for each institution (p-value=0.88). Indeed, almost half of responses for each institution were 'strongly disagree'. The variance of responses for the MMO and DEFRA were similar, 1.15 and 1.03 respectively but higher variance was recorded for IFCAs (2.06).

The distribution of the Likert scores for each response was relatively similar across all institutions, particularly for the MMO and DEFRA (Fig. 4).

Many respondents provided the same answers across each statement for an institution and of these uniform answers, most were 'strongly disagree' (Table 4). However, when comparing individual responses, only 28% of respondents assigned the same response for the MMO and DEFRA and only 4 responses were identical across all institutions.

A breakdown of the average scores by region revealed that the NEIFCA region ran counter to the trend that the IFCAs scored higher than the MMO and DEFRA (Fig. 5). A test of median comparison (Kruskal-Wallis test) of the regional breakdown of trust in each governance institution reported statistical insignificance using a 95% confidence level (p-value = 0.91, 6 df). However, the test revealed that there were statistically significant differences between the average scores of each respondent for each institution when individually broken down by region (p-value = 0.03, 7.5 $*10^{-8}$, 0.01 for IFCA, MMO and DEFRA, 6 df for each).

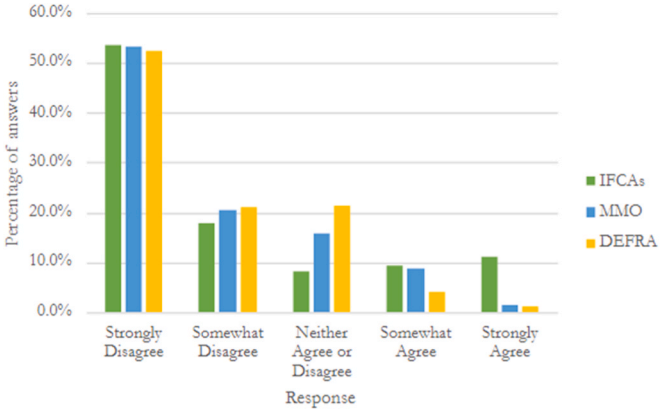


**Fig. 4.** Distribution of answer types across each fisheries governance institution. Strongly disagree was assigned the value 1 and strongly agree the value of 5. Sample size n = 46.

**Table 4**
Institutional response uniformity.

| | IFCAs | MMO | DEFRA |
|---|---|---|---|
| Total responses | 44 | 45 | 44 |
| Uniform responses | 19 (43.2%) | 16 (35.6%) | 22 (50%) |
| Uniform 'strongly disagree' responses | 15 (34.1%) | 15 (33.3%) | 17 (38.6%) |

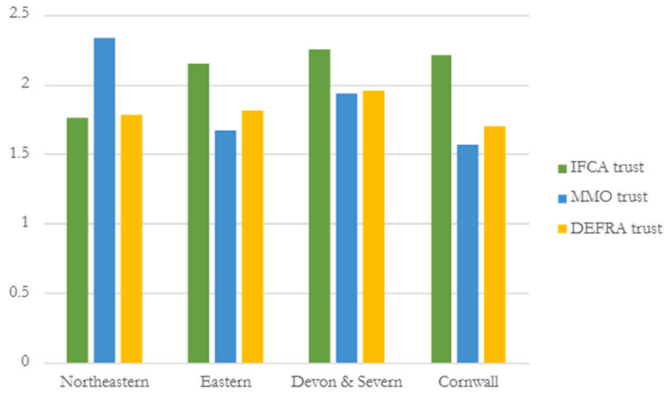


**Fig. 5.** The IFCA region breakdown of trust in each governance institution. Sample size = 45 (Excluding Kent & Essex for low number of responses).

Across the other demographics there were interesting statistically significant trends[6] (Fig. 6). According to their role on vessel, Crew members and Skippers presented higher levels of trust in the IFCAs than Skipper-owners, who gave a consistent level of trust across institutions. Crew members and Skippers also gave a lower score for the MMO, while DEFRA scoring was consistent across groups. For vessel length categories, scores increased from IFCAs to MMO and DEFRA for respondents in < 10 m vessel category, with the opposite for those in vessels > 10 m. Time in industry also revealed some variation across the groups. Fishers with less than 5 years of experience gave much higher scores for IFCAs and DEFRA than the MMO; 2.7 and 2.5 versus 1.2. The other age groups reported more consistent scoring, but there was a trend of trust scores increasing from the 5 to 10 years group to the 20 to 30 years group with a drop off in the 30 + year group.

### 3.2. *Qualitive responses on the forms of trust (questionnaire and interviews)*

Here we draw on qualitative responses from the questionnaire and interviews. In total, eight interviews were conducted, six in-person in Whitby (Yorkshire, UK and NEIFCA) and two online with EIFCA fishers. Interviews ranged from approximately 25 to 75 min with an average of 38 min. The demographics of each interviewee are summarised in Table A1. The sample is skewed towards skipper-owners. Table 5 highlights notable variations across the institutions when comparing the average scores of the different statements (see Table 2). In terms of rational trust there was a broad-based sentiment among fishers that the institutions which govern fisheries do not act in their best interests. Statement 2 (*[Organisation] Acts in the best interests of fishers like me*) scored the lowest for the IFCAs and DEFRA and second lowest for the MMO. For affinitive trust, the IFCAs and the MMO score well for Statement 4 on communication (*[Organisation] Is easy to communicate with*), however, the MMO has its lowest score for Statement 5 on transparency (*[Organisation] Is transparent in their actions*). DEFRA

[6] Statistical analysis of these trends was assessed using a 2-tail t-test or the demographic results vs the input assessment of each survey statement for each institution. P-values for all the results were below 0.05.

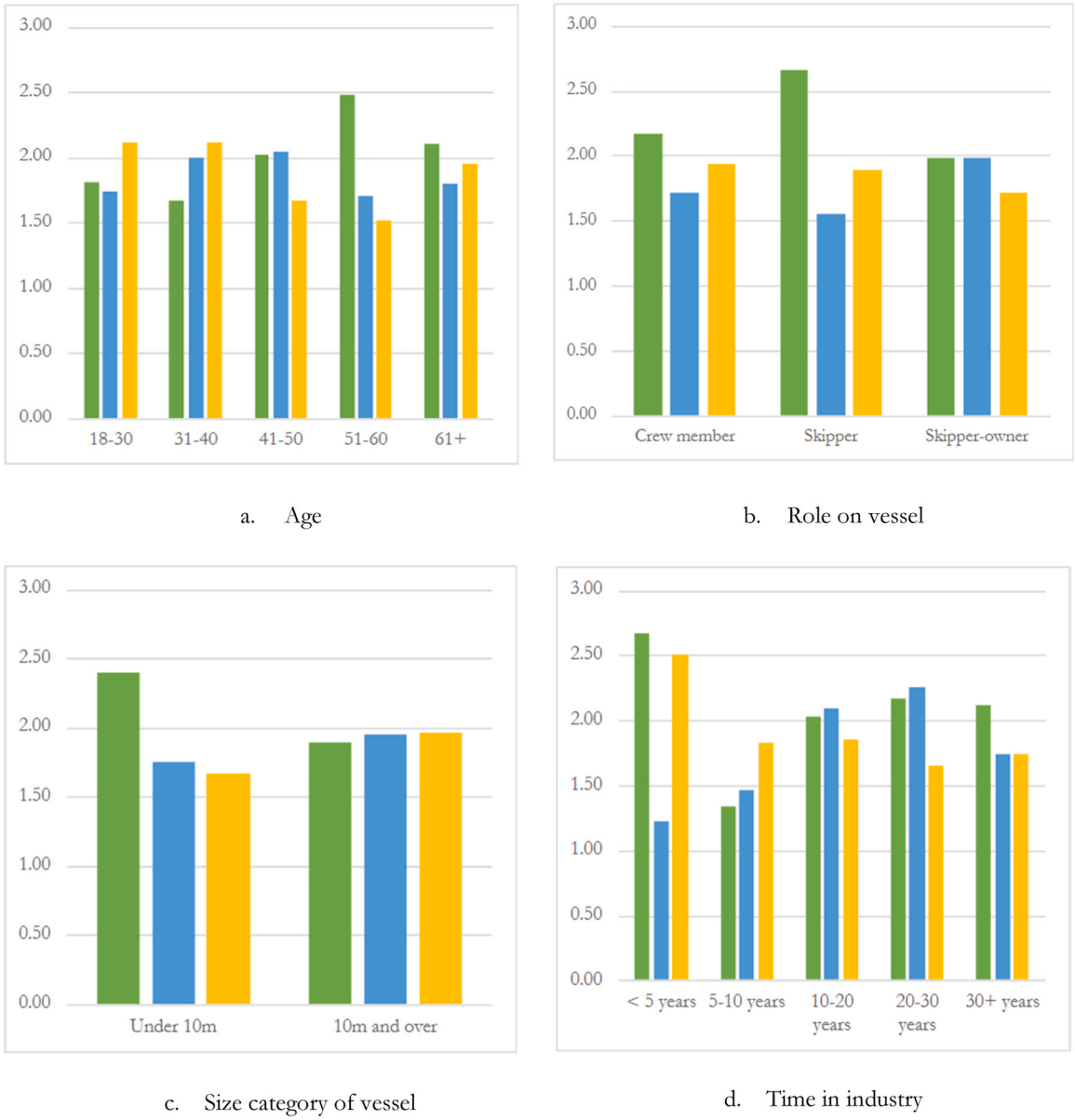


**Fig. 6.** Trust scores across the demographic groups. Note: IFCA is green, the MMO blue and DEFRA is yellow. Sample size n = 44, 45 & 44 for the IFCAs, MMO and DEFRA respectively.

**Table 5**
Mean Likert scores for the different forms of trust (as defined in Table 2) for each institution (sample size n = 44, 45 and 44 for the IFCAs, MMO and DEFRA respectively).

| | Rational | Affinitive | System-based | Mean |
|---|---|---|---|---|
| **IFCAs** | 2.12 | 2.26 | 2.11 | 2.16 |
| **MMO** | 1.86 | 1.99 | 1.73 | 1.86 |
| **DEFRA** | 1.86 | 1.91 | 2.10 | 1.93 |
| **Mean** | 1.95 | 2.05 | 1.98 | |

received the highest score on the systems-based form of trust, specifically for Statement 6 on reputation (*[Organisation] Is a reputable institution*).

Interpreting these scores using the Trust Ecology model, it seems that fisheries governance in England is lacking in trust diversity, with low levels of trust in each trust type. This likely indicates that the resilience in the fisheries sector to various disturbances such as natural disasters, changes in policy, performance failure or personnel turnover, is weak.

Almost half of the survey respondents (25) provided comments about at least one of the governance institutions (22 comments each for the IFCAs and the MMO and 12 for DEFRA). These were thematically analysed with the interview responses and below are organised under the forms of trust. Questionnaire comments were broadly negative and critical, with just three positive comments and eight comments of mixed sentiment. The interviews revealed the same sentiment towards fisheries governance institutions, but also other qualities of trust relations such as negative past experiences, differentiation between lack of trust and distrust, fishers' perspectives on the institution versus the personal connections they have with people within the institution (hereafter macro vs micro trust relations) and hopes and expectations for the future of fisheries governance.

*Competence-rational trust*: comments evidence that institutions are seen broadly as lacking in competence: "*The MMO and EIFCA are like two peas in a pod*" (Questionnaire) and "*they* [DEFRA] *just sign off IFCA rules*" (Questionnaire). The interviews supported the questionnaire evidence that the IFCAs, while easier to engage and communicate with, do not perform well on rational (and systems-based) forms of trust. Further,

distinct differences in micro and macro trust evaluations of the IFCAs were revealed. Statements such as: "*You know all the officers cause they come round regularly. That's a positive thing*" (Interviewee #2) but the same fisher later notes: "*We've struggled and struggled to get fishermen onto the IFCAs committee, it's an absolute nightmare and there isn't the amount of fishing people on ifcas, it's made up of councillors, this, that and the other, when you know, it becomes top heavy.*" (Interviewee #2). Similar views were held in relation to the MMO becoming more distant: *"You hardly ever hear from them [MMO] and when you do they say they'll get back to you and you don't. It is what it is."* (Interviewee #3).

*Interests-rational trust*: respondents complained that IFCAs are operating foremost as an enforcement agency against fishers' interests: "*From a fishers point of view this Ifca is more determined to police the fishers than making the fishery sustainable.*" (Questionnaire) and "*Northeastern ifca … is just a fisheries police force that aims to see all Fishers as criminal's*" (Questionnaire). This sentiment extends to other bodies: "*the mmo serves to protect everybody but fishermen.*" (Questionnaire) and "*Defra couldn't care less about our environment or our industry we are an inconvenience.*" (Questionnaire). Interviews confirm that IFCAs were viewed as insensitive to the interests of fishers particularly in relation to arbitrary and overzealous enforcement of the rules: "*they've got a little red book and the minute your name goes in that book is the minute they start harassing you.*" (Interviewee #3) and "*You've got to have strict policing, I'd agree. Not overzealous, surely not. They should just give them a good * ** ** ** ** * and say knock it off and a warning. That's all it needs surely.*" (Interviewee #5). In contrast the MMO's indifference was highlighted: "*When I want to quick decision on whether to take a boat, when someone is selling you a boat and you want to check its credential, check that it is what it is, it takes forever now.*" and "*since lockdown they've got more vague.*" (Interviewee #5) As the MMO handles licensing, this appears to lead to a lot of frustration and anxiety in fishers, "*It's very, very scary, very scary. You can lose a lot of money*" (Interviewee #2).

This sentiment that the best interests of fishers are not central to government bodies was expressed by many of the interviewees about DEFRA: "*it all comes down to what's been going on [mass mortality event], that's my only experience with them.*" and "*… before last year, never had much dealings with DEFRA and all. [I] thought that they were just a farming organisation and once you get off land, they don't care about you."* (Interviewee #2). However, during Covid-19 DEFRA was seen to act in the interests of fishers: "*the only time we have any dealings with defra with the if we're going for grants or like in COVID that they dished out some money to the industry*." (Interviewee #7).

*Values-affinitive trust:* questionnaire comments indicated a lack of shared norms and values leaving many to feel that they are governed without their consent and input. From the interviews, issues around shared norms and values extended to what fishers viewed as DEFRA's sporadic interest in the wider marine environment, where crises dominate interactions with fishers. The view that DEFRA does not understand fisheries or fishers has impaired responses to environmental crisis.

*Communication-affinitive trust and transparency-systems-based trust*: questionnaire comments discuss a mixed view around communication with some noting an ability to communicate with the IFCAs and the MMO. However, issues were raised around the lack of communication and cooperation: with the IFCAs "*We need a chief officer that engages with Fishers and listen to their concerns*" (Questionnaire) and also the *DEFRA* "*as the parent organisation for the mmo and ifca very little is done to communicate and engage with fishermen*" (Questionnaire). Overall, for fishers, engagement with the consultation process for creating the rules and regulations is seen as pointless: "*Our ifca, comes to us for consultation, we put ideas in, they ignore us…"* (Questionnaire) as decisions are made ignoring local knowledge and without transparency: "*Byelaws are continuously passed without full consultation in effect bypassing fishermen knowledge"* (Questionnaire).

Continuing the theme of communication and transparency, from the interviews, six fishers in the NEIFCA were asked as to whether they had heard of the JFS and if they had any hopes for the future of fisheries governance. Only one knew what it was through his Producer Organisation but had not been consulted on it. This fisher was not hopeful for the JFS: "*No, not helping no. If they wanted to really, really help, some brave person, I don't know if there is one in parliament, scrap the lot. Rewrite it from day one to help our fishermen.*" (Interviewee #5). For the other fishers, when prompted that there were going to be changes in fisheries governance, they in large responded negatively: "*Oh god they're not coming up with new rules are they?*" (Interviewee #1) and "*No doubt it will include more MPAs, more no take zones, more this, more that, more other, more dredging.*" (Interviewee #2). Overall, the hopes and expectations for the future of fisheries was low. However, some fishers hoped for a more dynamic system of rules and regulations, "*… everything is changing so it has to be more dynamic. If everyone is forced down the road of fishing just crabs and lobsters it … doesn't seem that sustainable. … more resilience, diverse as well, relieves a bit of pressure on the stock, a bit of rotation as well. Yeah so a bit more dynamic, a bit more proactive.*" (Interviewee #4).

*Reputation-system-based trust:* The general view of fisheries governance institutions was that they are not considered reputable: "*Corrupt and underhanded*" (Questionnaire) about the IFCAs, "*Commonly known as 'the marine mismanagement organisation'*" about the MMO (Questionnaire), and "*Liars and cover ups on tees dresdging*" (Questionnaire). From the interviews, views on the IFCAs indicate lack of trust: "*I'll tell you this, I don't really care what they have to say, I mean they're just mouth pieces aren't they.*" (Interviewee #1). Other comments indicate unproductive conflict and distrust: "*All it will end up with is a screaming match and a fall out between us and there's no need for that.*" (Interviewee #3). Of concern for the IFCAs is five of the eight interviewees referred to conflict. For the MMO the interview evidence points towards more of a lack of trust rather than distrust. Indifference was predominant: "*I'd say apathy is a better word we don't see enough of them.*" (Interviewee #1) and "*we will still push back and say you shouldn't be doing this, but you get, you get a bit jaded…"* (Interviewee #8). This type of sentiment was referenced by five of the fishers, but only one fisher referenced some level of conflict with the MMO. For DEFRA reputation is key for systems-based trust: "*…in general they are a bit more reputable*." (Interviewee #4).

## 4. Discussion

Our forms of trust results captured in a questionnaire and in-depth interviews find a relative uniformity of responses (low variation in the scores) that may indicate a near complete breakdown of trust among many fishers towards fisheries governance institutions in the UK. Low levels of trust in fisheries governance likely have deep historical roots, due to events such as the Cod Wars from the 1950 s to 1970 s and the UK subsequently joining the EU and CFP [21]. It was hoped by many in the UK fishing industry that Brexit would kick start a new era for UK fisheries, but many now feel let down [21]. The after Brexit disappointment and the intent to redesign the UK fisheries polices and governances, therefore offer an ideal condition to investigate the diversity of trust, as in Stern and Baird's [32] Trust Ecology model, to help appreciate the dynamic of the governance system and strengthen the weak resilience to multiple disturbances. At a time when fisheries management is seeking to enhance the long-term sustainability of the sector, this result suggests that there is an urgent need to identify pathways to rebuild trust in fisheries institutions to underpin successful fisheries governance post-Brexit.

As indicated, our results paint a worrying picture for the future of fisheries governance. Fishers' hopes for the future of fisheries governance are low, with very few of the fishers interviewed aware of the Joint Fisheries Statement (JFS). If the UK is to transition to a long-term, sustainable system of fisheries governance, the government and the JFS must seek to repair trust relations with fishers because, for fishers, "*That trust is gone. And I don't see how they can govern without the trust of the industry long term.*" (Interviewee #7). In the sections below we explore key themes around local factors and trust before suggesting recommendations on how to rebuild trust.

### 4.1. The role of local conditions on trust scores

There was evidence of not just low levels of trust in fisheries institutions but of distrust in regional institutions (IFCAs). For example, many Yorkshire fishers interviewed viewed the mass mortality of crabs and lobsters in 2021–2022 as a pivotal event that positioned the fishers and governance institutions against each other, with key disagreements on the cause(s) of the dieback.[7]

*NEIFCA region*: The NEIFCA provides an ideal case study demonstrating the functionality of the forms of trust model and how a weak Trust Ecology disrupts NRM. Stern and Baird [32] note that high systems-based trust lessens the importance of the other forms of trust. A common disturbance for systems-based trust is catastrophic environmental change, which in the NEIFCA was compounded by the apparent lack of transparency (affinitive trust) and communication (affinitive and systems-based trust) and a perception that the NEIFCA was not acting in the interests of fishers (rational trust) throughout the investigation process which combined undermined the reputation of the institution (systems-based trust). Fig. 7 reports low transparency scores (Statement 5 in Table 2) for both the regional IFCA and DEFRA, indicating these are the bodies that have lost trust following the mass die-off and suspected cover-up. These scores for transparency and systems-based trust are of particular note, as systems-based trust has been identified as lessening the importance of other forms of trust according to Stern and Baird [32]. Furthermore, four of the six fishers interviewed in this region referred to some level of conflict with DEFRA. It is possible to make the evaluation that in the NEIFCA there is distrust of the IFCA and DEFRA, and a lack of trust in the MMO.

*EIFCA region*: Two recent events appear to have eroded trust in the EIFCA region. First was the publishing of a report into individual crab potting in a Marine Conservation Zone (MCZ) which covers a chalk reef off the coast of Cromer. It recommended the restriction or banning of potting to protect the chalk reef, potentially threatening the local fishing community [47,48]. Second, the awarding of a contract for an offshore wind farm off the coast of Cromer has not only created another zone in which fishing is restricted, but the power cables which connect to the grid run through parts of the MCZ [49]. Several questionnaire comments noted that in a recent meeting of fishers with the EIFCA, the MMO voted with the EIFCA to ban fishers from making any proposals regarding the chalk reef fisheries management, effectively restricting the democratic processes. This led to fishers concluding things like "*[The] Eastern ifca is a total dictatorship taken by the CEO.*" (Questionnaire).

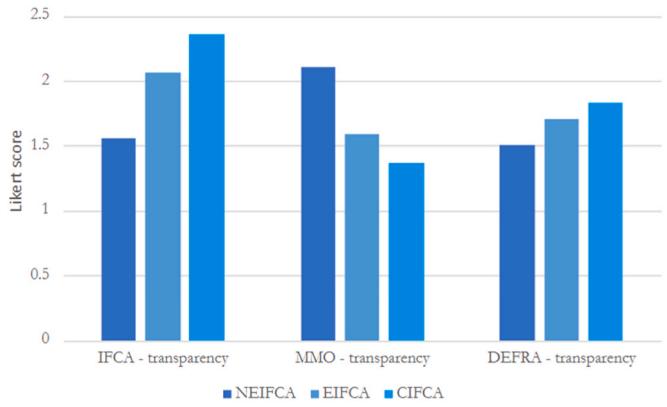


**Fig. 7.** A comparison of survey respondents average Likert score for Statement 5 (transparency) for three regions. Sample size: NEIFCA n = 9, EIFCA n = 17, CIFCA n = 11.

The local conditions in the EIFCA appear to have damaged fishers' perspectives of each of the governance institutions, with the IFCA implementing a raft of measures in the MCZ, the MMO licensing offshore windfarms, and DEFRA creating the MCZ. However, the variance in trust scores is high for the EIFCA at 2.32 as compared to 0.45 and 0.48 for the MMO and DEFRA, respectively.

*CIFCA region*: Brexit was portrayed to the fishing industry as a huge opportunity, but the reality has been a disappointment for the fishing industry, especially the fact that EU vessels are still allowed to fish within the 6–12 mile zone off the southern English coast [21]. The post-Brexit trade deal with the EU has raised bureaucratic barriers for exporting fish to the EU, impacting fishers' livelihoods [50]. Support has been provided by DEFRA, via the MMO, in the form of a single, one-off payment (MMO, 2021). On top of this, the post-Brexit implementation of the long planned in-vehicle monitoring system (iVMS for vessel tracking) has been beset with problems [37]. The haphazard introduction of iVMS and the grant scheme has caused Cornwall fishers to submit a letter of no confidence in the MMO, calling for a 'root and branch' review [37]. These events appear to have impacted the trust scores of the MMO and DEFRA in the CIFCA. Of note is that the MMO scored 1.56, the lowest score for the MMO in any of the regions and the variance was just 0.76. The strength of the lack of trust in the MMO is demonstrated in the questionnaire comments, with statements like "*The MMO are unhelpful [and] disrespectful, … they are the worst organisation I have ever had to deal with … their rules and policies have gotten significantly worse since Brexit. They are not fit for purpose in my opinion.*" which speak to (in)competence and reputation issues associated with rational and systems-based forms of trust.

### 4.2. Adaptive, effective, and democratic regional management

The breakdown in trust in the three IFCA regions demonstrates how local conditions can drive grievances and further break down trust in fisheries governance institutions when the National Trust Ecology is weak. Actions that promote and strengthen more effective regional and adaptive governance, with more face-to-face interaction, improving democratic processes and a focus on resolving local issues could be a foundation for building general trust in fisheries governance. In the NEIFCA region, Interviewee #2 commented that making the transfer or purchasing licenses bureaucratically challenging and/or prohibitively expensive has driven what used to be a multi-species fishery to one that only depends on crab and lobster. Supporting this view, research by Davies et al. [46] did find that vessels under 10 m throughout England lack fishing opportunities driven by the lack of quota and the prohibitively high cost of leasing quota. However, this view overlooks other factors that have played a role in changing the landscape of UK fisheries such as poor stock status [46] and UK fishing quota mostly going to the larger, often less sustainable vessels [26]. Whatever the causes, the specialization of fishing for specific species appears to have exacerbated the impact of the crustacean mass mortality event off the Yorkshire coast, because there was not the capacity, resilience and quota to diversify fishing activities.

Adaptive, dynamic governance could respond promptly to minimise harm to the fisheries community through the provision of support, including diversifying employment opportunities and building rational forms of trust (both competence and interests). However, the perceived problems in the EIFCA or CIFCA also revolve around perceived undemocratic processes and the ineffectiveness of governing institutions, respectively both of which represent rational forms of trust. Here the concept of institutional adaptive governance that focuses on local, self-governing institutions [3,51] and learnings in the UK context from pilots such as the North Devon Marine Pioneer Project could start to rebuild trust [52]. This research in Devon identified fifteen factors that enable effective co-management as well as highlighting the importance of engagement and joint action by all levels of governance.

[7] See, https://www.york.ac.uk/news-and-events/news/2022/research/toxic-chemical-may-have-killed-crabs/.

### 4.3. Rebuilding trust relations

Respondents' comments provide some recommendations on how to rebuild trust. Fishers noted a preference for frequent, in-person contacts with fishery institutions' staff to promote better communication (affinitive and systems-based trust), to improve service (rational trust), and to provide an opportunity to share norms and values (rational and affinitive trust). Other research also suggests that reinforcing systems-based, rational and affinitive trust builds trust more broadly across stakeholders [53]. A reinforcing trust loop could start with fisheries governance institutions building affinitive trust with face-to-face communication that opens progress in rational forms of trust through improvements in service quality and better understanding of fishers' interests and the pivotal role their feedback could play in improving management outcomes (Williams et al., 2022). Here feedback is central to the loop and would start to address comments such as "*The biggest problem with our EIFCA is that it is a complete dictatorship, where fisherman can't have a say and are not listened too.*" (Questionnaire) and thereby build the operational transparency and the institution's reputation among fishers (systems-based trust).

In the case where there is distrust, rebuilding trust is more complex. Here the trust repair literature highlights the importance of not only trustworthiness demonstration (detailed above with steps to build affinitive trust) but also distrust regulation (Gillespie and Dietz, 2009). Distrust regulation involves addressing the factors which caused the initial disturbance which could involve establishing conflict management mechanisms [52] or employing a facilitator with powers to reinforce systems-based trust through promoting democratic decision making and establishing and enforcing ground rules [53]. Our research suggests other actions could also be critical in rebuilding systems-based and affinitive forms trust (transparency and communication) if institutions committed to seek independent and transparent expert advice and to openly sharing it and rational trust through demonstrating competence by taking responsibility in the form of paying compensation for losses (Gillespie and Dietz, 2009). Finally, it was notable in interviews that personal connections with the organisation improved cooperation and collaboration for all cases of personal connections mentioned by interviewees. This emphasises the potential for rebuilding trust with face-to-face interaction and demonstration of active listening [32]. Likewise, Ford and Stewart [15] highlighted that working partnerships between fishermen and scientists also increase the trust in the science which underlines many governance decisions. As above, these actions would reinforce all forms of trust improving trust diversity and thereby the resilience of fisheries governance.

Future research could not only seek the views of fishers from all regions in England (3 IFCAs were either not or were poorly represented in the survey responses) as well as those in Wales, Scotland and Northern Ireland, but also study the views of the managers/regulators. Further, the survey demographics questions could be expanded to include for example employment type, part vs full-time. The interviews' focus on fishers in EIFCA and NEIFCA allowed us to explore the influence of heightened local exogenous events on trust and align with case study selection guidance on the criticalness, extremeness and revelatory power of the case(s) [54]. However, even within these case studies there could be some self-selection bias, in which those who volunteered to participate in the questionnaire and interviews might not be representative of other fishers or their perspectives [55]. The design of future research on trust in fisheries could experiment with different approaches such as conducting the research outside of peak fishing times/seasons, offering incentives, and working more closely with fishing industry bodies such as Seafish, the National Federation of Fishermen's Organisations, and the New Under Ten Fishermen's Association (NUTFA) to encourage wider participation and gather potentially more representative samples of fishers. For example, although over half of our respondents were from under 10 m vessels, that sector still appeared underrepresented in terms of vessel numbers. Active engagement with bodies such as the NUTFA would likely help reach more of those fishermen. Furthermore, while this research allows for the quantification of the forms of trust and hence the assessment of Trust Ecology in fisheries management, future research could explore if and how different disturbances weigh differently on the forms of trust and utilise follow-up surveys and interviews to assess more closely how trust develops.

## 5. Conclusions

Our novel approach and survey design was devised to unveil the level of trust in the English fisheries sector. Our methodological approach relates forms of trust to the elements of trust assessed in the meta-analysis by Ford et al. [31] thereby bringing together two fields of trust evaluation. This novel approach to surveying trust provides a more quantitative method to analyse the forms of trust and assess the Trust Ecology in NRM strengthening both approaches to understanding trust. Furthermore, the mixed method approach enabled the evaluation of the levels of trust at which complacency or distrust begin. While governance institutions are aware that fishers trust is low [18], the necessary actions to rebuild trust depend on this distinction between lack of trust and distrust.

The validity of our approach is confirmed by the similarity to previous surveys of fishers' trust in fisheries' governance institutions. Fishers' trust in the IFCAs, the MMO and DEFRA was low and, while there were regional differences, the general trend was that the MMO and DEFRA scored lower than the regional IFCAs. Utilising the Trust Ecology model, it is evident that a history of failing to deliver and of broken promises (Cod Wars, CFP and Brexit) has undermined trust in the institutions which govern fisheries in the England and that they are weakly resilient to various potential disturbances such as natural disasters, changes in policy, performance failure or personnel turnover.

The JFS and the subsequent FMPs provide an opportunity to improve trust relations by directly involving the fishing communities in the processes of governance. This could address competence (rational trust), bridge interests and values between fishers and governance institutions (rational and affinitive trust) and improve communication and transparency (affinitive and systems-based trust). Our results also suggest that NRM management would be boosted by an institutional commitment to improve trust relations and to learn from extreme exogenous events. The alternative, a top-down approach of natural resource governance, can fail to nurture a strong and diverse Trust Ecology, weakening resilience to disturbances and undermining the implementation of policy instruments. This is the case for English fisheries, but it provides a mirror for other institutions responsible for managing natural resources.

## CRediT authorship contribution statement

**Stewart D. Bryce:** Writing – review & editing, Writing – original draft. **Ferrini Silvia:** Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. **Bark H. Rosalind:** Writing – review & editing, Writing – original draft. **Grilli Gaetano:** Project administration, Writing – original draft, Writing – review & editing. **Dixon Maximilian:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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## Appendix

Table A1. Interviewees' demographics (n = 8).

| Variable | Classes | % |
|---|---|---|
| Age | 18-30 | 25 |
| | 31-40 | 12.5 |
| | 41-50 | 0 |
| | 51-60 | 37.5 |
| | 61 + | 12.5 |
| Role | Crew member | 25 |
| | Skipper | 12.5 |
| | Skipper and owner | 62.5 |
| Vessel type | Under 10 m | 40 |
| | Over 10 m | 40 |
| Time in industry | < 5 years | 12.5 |
| | 5-10 years | 25 |
| | 10-20 years | 25 |
| | 20-30 years | 0 |
| | 30 + years | 37.5 |
| Region | Northeastern | 75 |
| | Eastern | 25 |

Table A2. Interviewees' role and experience in fisheries (n = 8).

| Interviewee | Age (yrs) | Role | Vessel type | Time in industry (yrs) | Generation | Region |
|---|---|---|---|---|---|---|
| 1 | 31 - 40 | Crew | > 10 m | 5 - 10 | 1st | Northeastern |
| 2 | 51 - 60 | Skipper-Owner | > 10 m | 30 + | 6th | Northeastern |
| 3 | 18 - 30 | Skipper-Owner | < 10 m | 5 - 10 | 1st | Northeastern |
| 4 | 18 - 30 | Crew | < 10 m | < 5 | 1st | Northeastern |
| 5 | 61 + | Skipper-Owner | > 10 m | 30 + | 6th | Northeastern |
| 6 | 51 - 60 | Skipper-Owner | < 10 m | 10 - 20 | 1st | Northeastern |
| 7 | 61 + | Skipper-Owner | > 10 m | 30 + | 6th | Eastern |
| 8 | 51 - 60 | Skipper | < 10 m | 10 - 20 | 4th | Eastern |

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2024.106034.

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